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ANOMALOUS HEADS OF THE STERNOCLEIDOMASTOID MUSCLE: CLINICAL AND ANATOMICAL PERSPECTIVES

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Abstract: The sternocleidomastoid (SCM) muscle, an essential muscle in the human neck, is usually described as having two heads: the sternal and clavicular heads. This study explores the different anatomical variations of the SCM muscle, focusing on how often these variations occur, their clinical implications, and their significance in surgical contexts, especially the presence of extra (supernumerary) heads.

Introduction:

The SCM muscle is crucial for neck movement and serves as a key landmark in many clinical and surgical procedures. Reports of variations, such as additional heads, can have significant clinical implications. This study aims to document these variations and understand their impact on clinical practice.

Methods:

We carried out a detailed anatomical study on cadaveric specimens to identify variations in the SCM muscle. Additionally, we reviewed existing literature to supplement our findings. We measured the length, width, and distance from origin to insertion of the SCM muscle heads, noting any peculiar insertions or innervation variations.

Results:

Anatomy of the Sternocleidomastoid Muscle:

Typically, the SCM muscle originates from the manubrium of the sternum (sternal head) and the medial part of the clavicle (clavicular head), merging at the mastoid process of the temporal bone and the superior nuchal line of the occipital bone. It is primarily innervated by the accessory nerve (cranial nerve XI) with help from the second and third cervical spinal nerves. This muscle helps in neck rotation and flexion and assists in breathing.

Anatomical Variations:

Our study found several anatomical variations in the SCM muscle, including additional heads and differences in insertion and innervation:

1. **Supernumerary Clavicular Head:** In one specimen, an extra head originated from the clavicle, separate from the usual sternal and clavicular heads.
2. **Three-Headed SCM Muscle:** Another specimen had three heads, with an additional head originating from the clavicle, in addition to the usual sternal and clavicular heads.
3. **Other Variations:** We also found bifurcation or trifurcation of the heads, peculiar insertions, and differences in innervation and blood supply.

Table 1: SCM Muscle Variations:

Variation	Length (cm)	Width (cm)	Distance from Origin to Insertion (cm)	Distance between Head Origins (cm)	Peculiar Insertions	Innervation Variations
Supernumerary Clavicular Head	12.70	1.54	8.30	4.73	No	No
Three-Headed SCM Muscle	8.27	1.53	19.78	4.62	No	No

Case Studies:

1. **Supernumerary Clavicular Head:** In one cadaver, we found an extra clavicular head of the SCM muscle, which had significant clinical and surgical implications.
2. **Three-Headed SCM Muscle:** Another cadaver exhibited a three-headed SCM muscle, highlighting the complexity and variability of this muscle.



Analysis:

The analysis compared the lengths, widths, and distances of the muscle variations. Here are the comparisons:

- **Length:** The "Supernumerary Clavicular Head" is 12.70 cm long, while the "Three-Headed SCM Muscle" is 8.27 cm long, indicating the supernumerary head is longer.
- **Width:** The widths are very similar, with the "Supernumerary Clavicular Head" being 1.54 cm wide and the "Three-Headed SCM Muscle" being 1.53 cm wide.
- **Distance from Origin to Insertion:** The "Supernumerary Clavicular Head" spans 8.30 cm from origin to insertion, whereas the "Three-Headed SCM Muscle" spans 19.78 cm, indicating a greater span for the three-headed muscle.

Discussion:

Having additional SCM heads can have significant clinical implications:

1. **Surgical Implications:** Knowing these variations is crucial during neck surgeries to avoid accidentally injuring the muscle or its neurovascular structures. Variations in muscle length, width, and insertion points require careful dissection and consideration during surgical planning.
2. **Radiological Implications:** Radiologists need to be aware of these variations to avoid misinterpreting imaging results, such as mistaking an accessory head for a pathological mass. Correctly identifying these variations can prevent diagnostic errors.
3. **Anesthetic Considerations:** Variations in the SCM muscle can affect the efficacy of local anesthetics and nerve blocks, requiring precise anatomical knowledge. Understanding these variations can improve anesthesia success in neck procedures.
4. **Botulinum Toxin Injections:** Patients with additional muscle heads may need adjusted dosages for effective treatment. More muscle mass due to supernumerary heads might require higher doses of botulinum toxin for treating conditions like cervical dystonia.
5. **Reconstructive Surgery:** Variations must be considered in procedures involving the SCM muscle, such as myocutaneous flaps for head and neck reconstruction. Recognizing these differences can help optimize surgical outcomes and minimize complications.

Conclusion:

Anatomical variations of the SCM muscle are significant in clinical and surgical practices. Recognizing these variations can prevent complications during surgery and improve treatment outcomes. Ongoing research and documentation are essential for advancing our understanding and management of SCM muscle anomalies. Healthcare professionals should stay informed about recent anatomical research and incorporate it into their diagnostic and therapeutic strategies.

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